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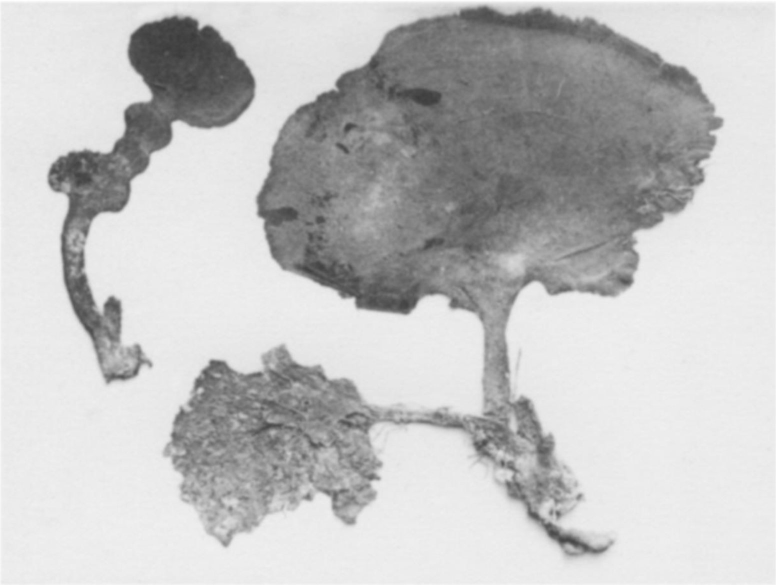

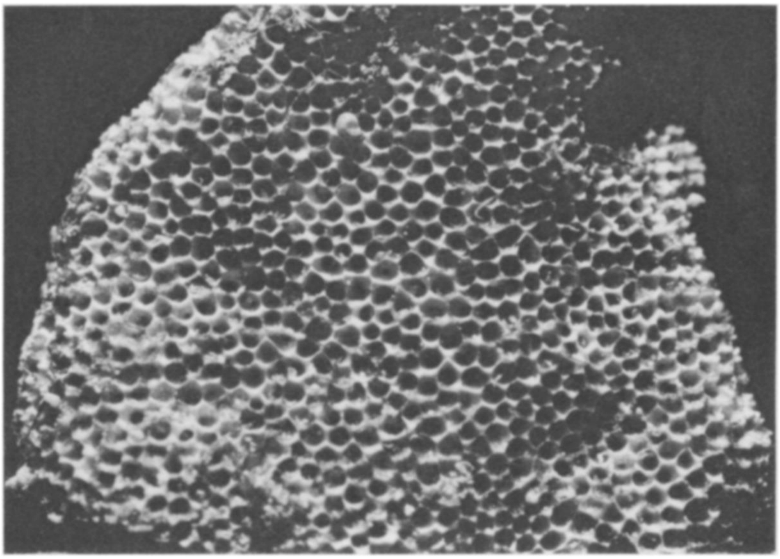

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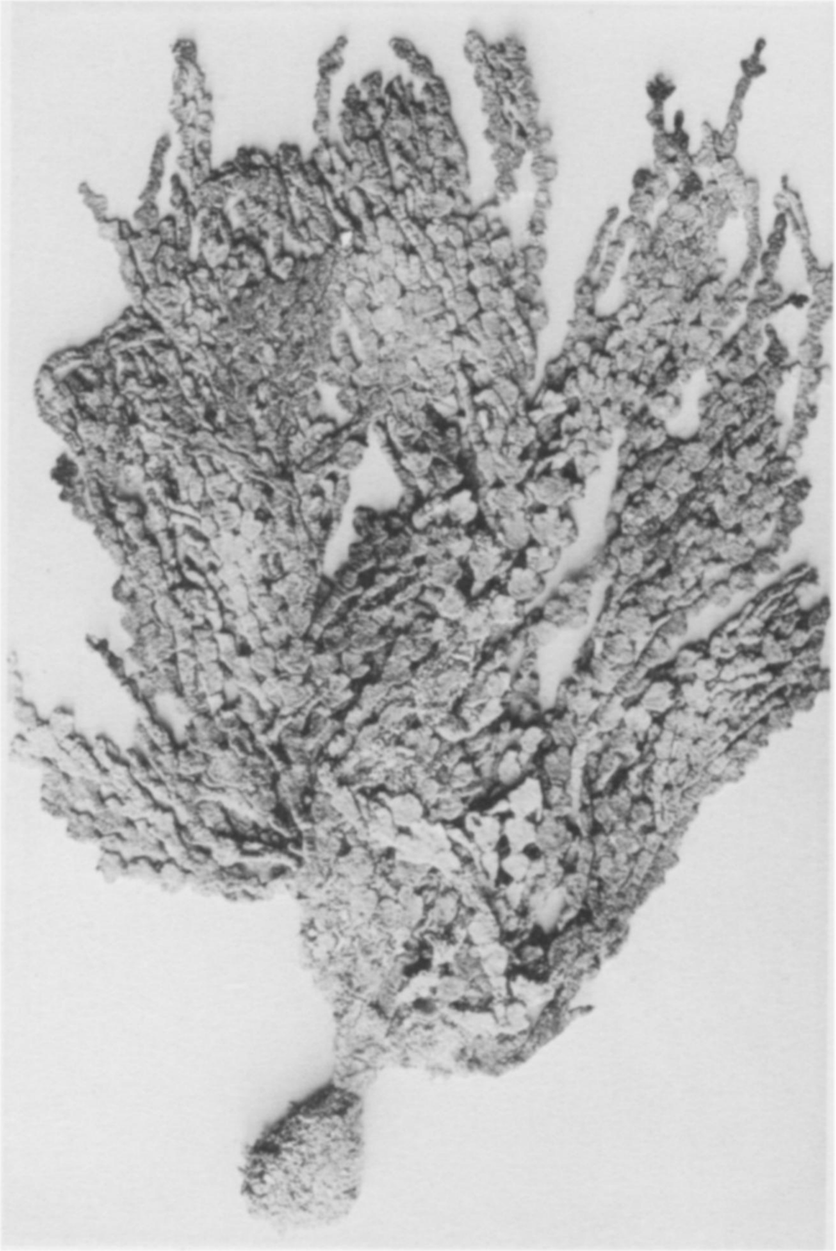
1. AVRAINVILLEA LEVIS M. A. Howe
2. HALIMEDA FAVULOSA M. A. Howe

HELIOTYPE CO., BOSTON.



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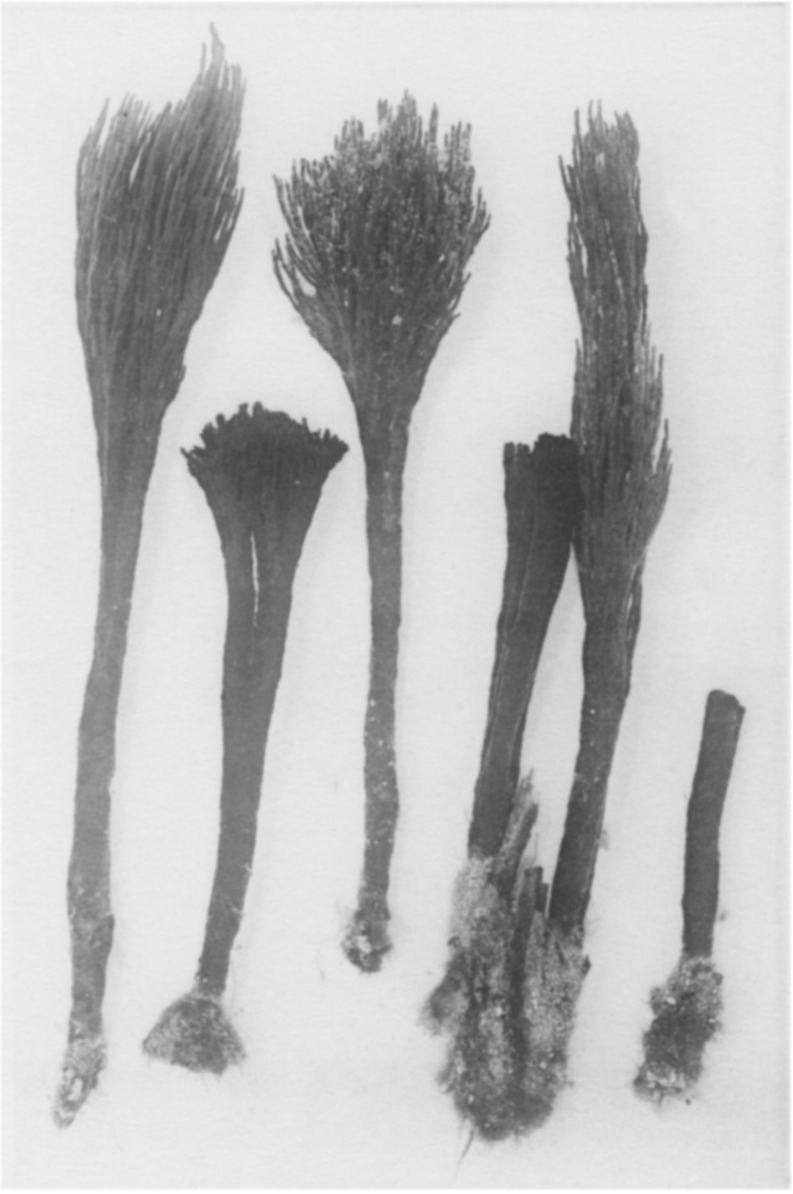
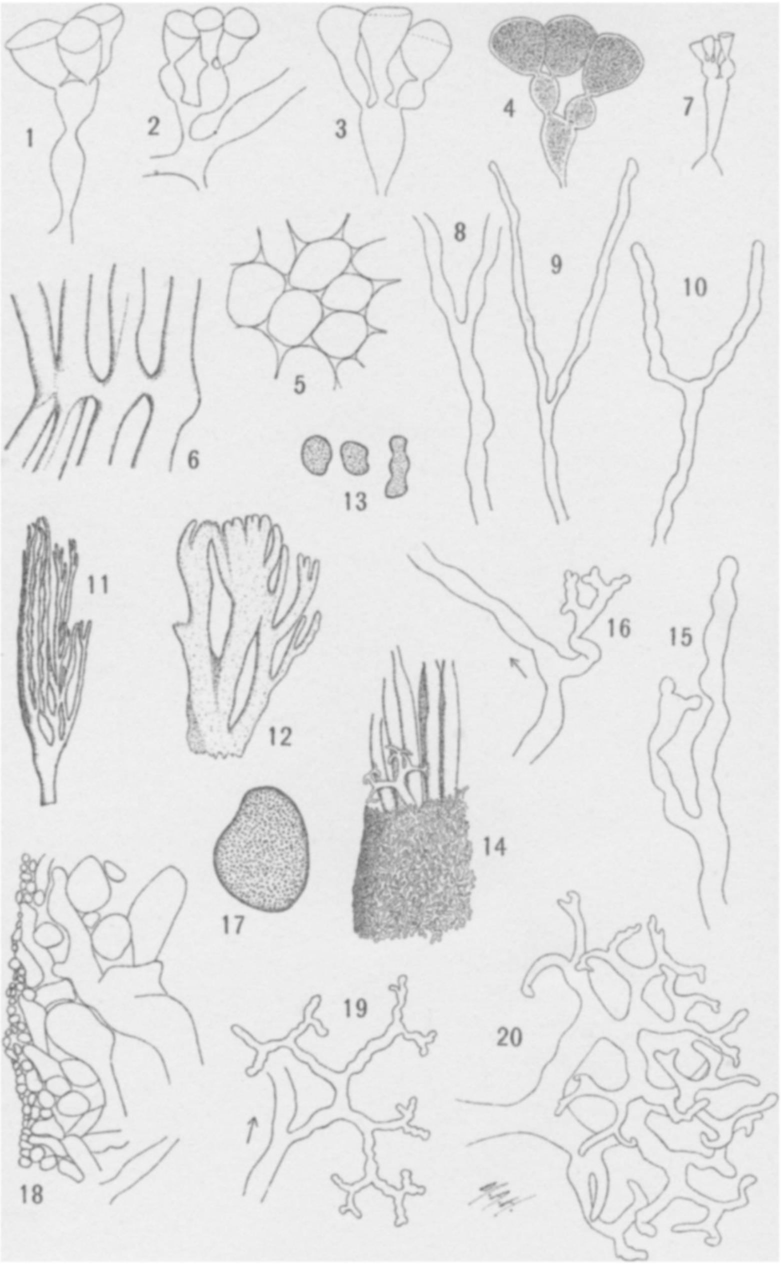


CLADOCEPHALUS SCOPARIUS M. A. Howe

HELIOTYPE CO., BOSTON.



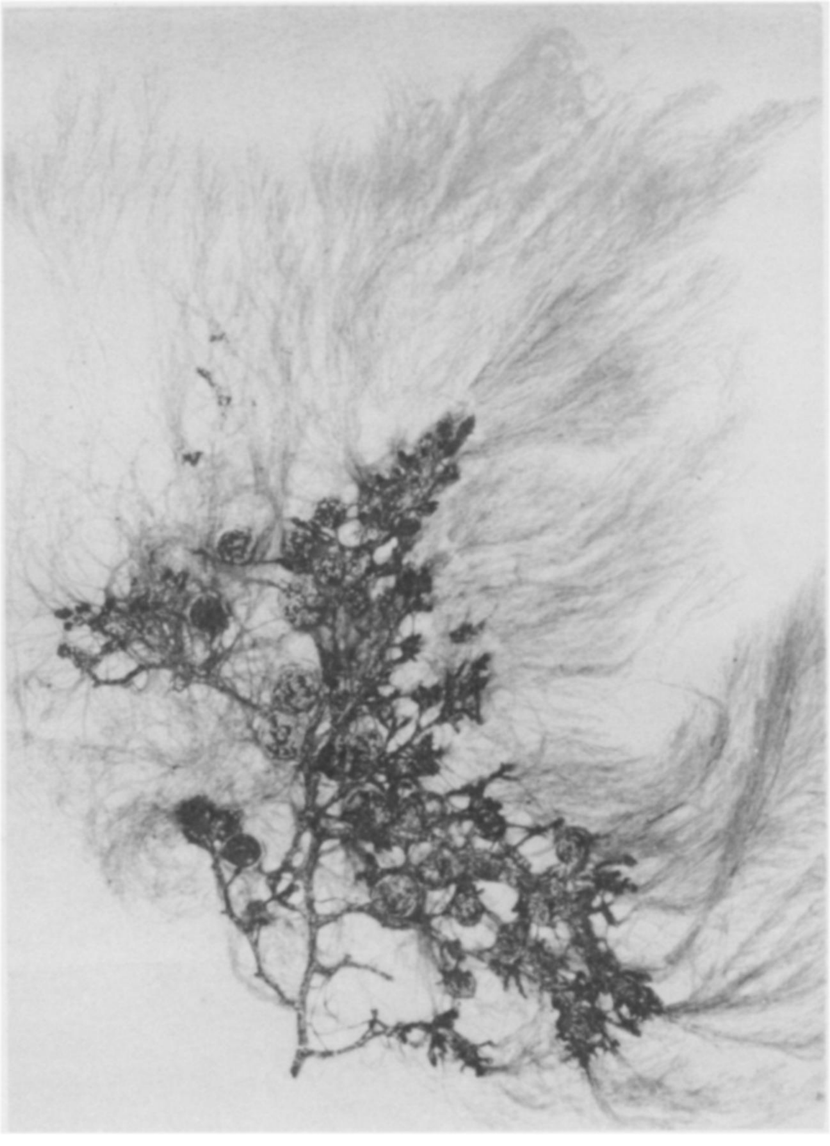
1-6. HALIMEDA FAVULOSA M. A. Howe

7. HALIMEDA TRIDENS (Ell. & Soland.) Lamour.

8-10. AVRAINVILLEA LEVIS M. A. Howe

11-20. CLADOCEPHALUS SCOPARIUS M. A. Howe

HELIOTYPE CO., BOSTON.



SARCOMENIA FILAMENTOSA M. A. Howe

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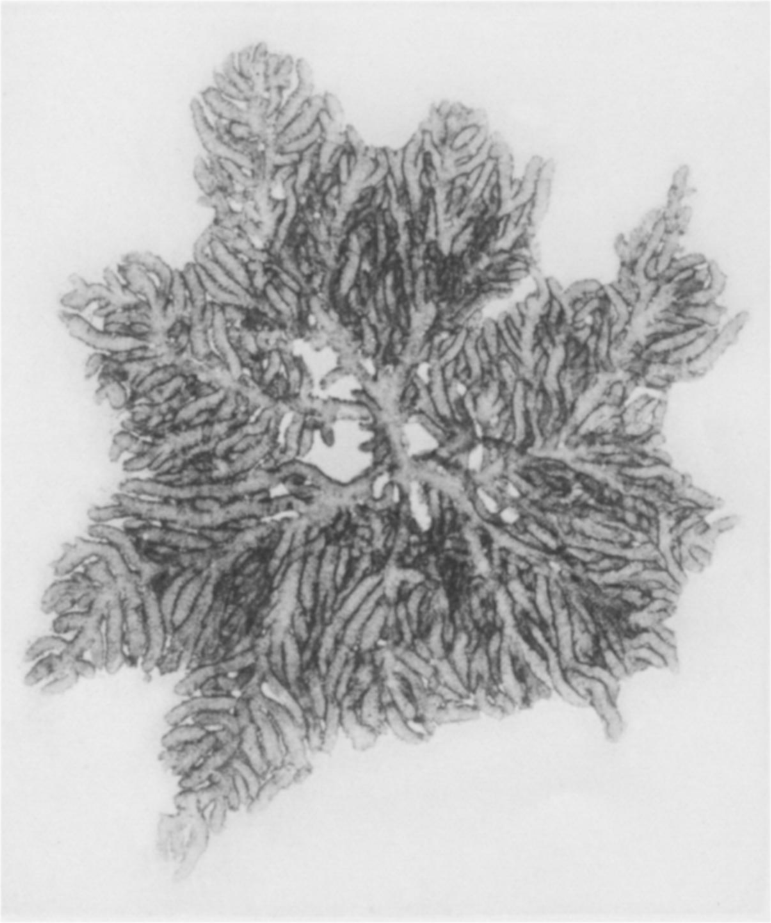
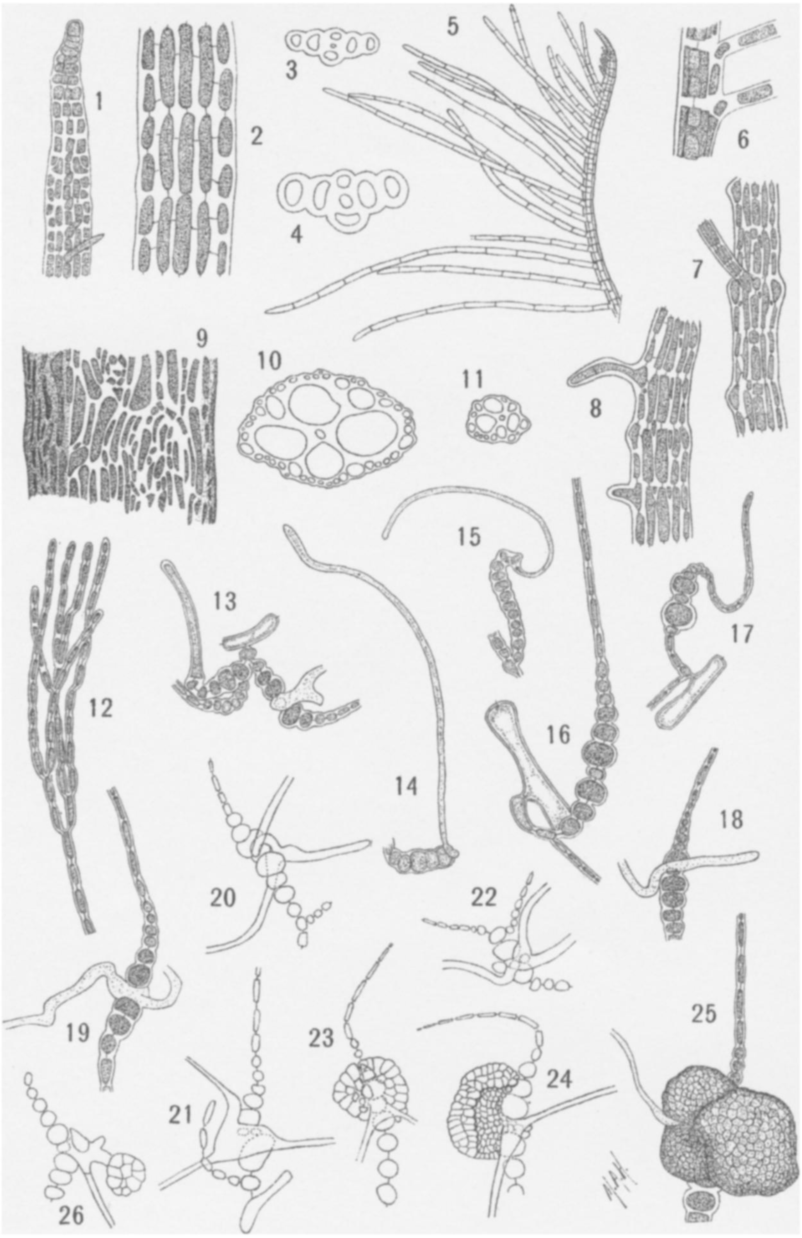


DUDRESNAYA CRASSA M. A. Howe.

HELIOTYPE CO., BOSTON.



1-11. SARCOMENIA FILAMENTOSA M. A. Howe

12-26. DUDRESNAYA CRASSA M. A. Howe

HELIOTYPE CO., BOSTON.

Vol. 32 No. 11

BULLETIN

OF THE

TORREY BOTANICAL CLUB

NOVEMBER, 1905

Phycological studies—II. New Chlorophyceae, new Rhodophyceae, and miscellaneous notes*

MARSHALL AVERY HOWE

(WITH PLATES 23–29)

A. NEW CHLOROPHYCEAE

Halimeda favulosa sp. nov.

Of a light bright-green when living, often albescent or yellowish on drying, rather flaccid, suberect or more commonly decumbent (especially if uncovered at low tide), somewhat easily friable when dry, the surface then strongly favulose even to the naked eye and with a subcrystalline lustre; plants reaching a height or length of 9–22 cm., usually of congested habit, the numerous branches mostly originating near the very short, flattened stipe, this consisting of 1–4 more or less fused segments: rhizoids forming a bulbous mass with the adherent granules of sand: segments variable in form, ranging, without apparent order, from discoid and often trilobed to cylindrical and entire in different parts of a single individual, 4–9 mm. long, 2–9 mm. broad, 0.5–2 mm. thick: peripheral utricles turbinate, subcrateriform, obovoid, or pestle-shaped, 150–400μ long, 110–260μ in diameter in surface view, supported and separated by calcareous calyces, the exposed rounded-obtuse or truncate apical portion strongly collapsed on drying, even the whole utricle often withdrawing from the calcareous lateral walls and shriveling to the bottom of the cup; utricles free on decalcification or but slightly and irregularly coherent; subcortical layer thin, the central filaments easily visible through the cortex after removal of the lime: filaments of the central strand coherent at the nodes, being there closely connected by

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* Investigation aided by a grant from the John Strong Newberry Fund of the Council of the Scientific Alliance of New York.

[The BULLETIN for October (32: 515–561) was issued 21 O 1905.]

very short anastomosing processes. [PLATE 23, FIGURE 2; PLATE 24; PLATE 26, FIGURES 1–6.]

Near low-water mark in the Bahama Islands: *no. 3981*, type (Cave Cays, Exuma Chain, 19 February 1905, M. A. H.); *nos. 3417b* and *3421b* (Rose Island); *no. 4186a* (Stocking Island, Exuma Harbor).

Halimeda favulosa simulates in form, size and habit certain conditions of *H. tridens* (Ell. & Soland.) Lamour. or of *H. tridens Monile* (Ell. & Soland.) * but is easily and constantly distinguished by the very large peripheral utricles (110–260 µ *vs.* 33–68 µ in *H. tridens*) which, on drying, collapse or withdraw into the subtending and separating lime-cups, leaving the surface conspicuously and rather beautifully favulose. In the character of the peripheral utricles the species suggests *H. macrophysa* Ask., though its utricles are sometimes even larger than in that, according to the measurements given by Askenasy and by Barton, but it has the size, form, and node-characters of the *H. tridens* group instead of the *H. Tuna-H. macrophysa* alliance. It evidently bears a relation to *H. tridens* similar to that of *H. macrophysa* to *H. Tuna.* In case of three out of the four collection numbers cited above, *H. favulosa* was found growing in company with *H. tridens* or *H. tridens Monile* and resembling them so much in habit that the distinctive characters escaped observation at the time of gathering.

There is a possibility that *Halimeda favulosa* will prove to be *H. brevicaulis* Kütz., † described from the Bahamas, but the doubts in regard to this can probably never be resolved unless Kützing's specimen, which now seems to be lost, is found.‡ *H. brevicaulis*, according to Kützing's figure and brief description, might equally well be a form of the extremely variable *H. tridens*, which is more abundant in the same region. The short stipe of "*brevicaulis*" has no special significance, but the apparently flaccid habit and tapering branches, it must be admitted, are rather suggestive of *H. favulosa.* Yet flaccid, decumbent conditions of *H. tridens* occur. Kützing describes the stipe of *H. brevicaulis* as terete, while in all the specimens of *H. favulosa* that we have seen it is much flattened and in all the branching is much more congested. Furthermore, it seems hardly probable that Kützing, doubtless studying a dried specimen, would have failed to notice the peculiar and striking favulosity of the surface if he had had before him the species described above. Kützing's figure of *Halimeda Monile* (*l. c. pl. 26. f. 1*) illustrates the habit of the moniliform condition of *H. favulosa* rather well.

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* **Halimeda tridens Monile** (Ell. & Soland.)
Corallina Monile Ell. & Soland. Nat. Hist. Zooph. 110. *pl. 20. f. c.* 1786.

† Tab. Phyc. **8**: 11. *pl. 25. f. 2.* 1858.

‡ See "Addendum" on page 586.

Hauck (Hedwigia **25**: 168. 1886) has gone on record as having seen an authentic specimen of *H. brevicaulis*,* but neither in the herbarium of Hauck nor that of Kützing, both now owned by Mme. Weber-van Bosse, is such a specimen to be found. The species is unrepresented also in a set of cotypes sent by Kützing to Montagne and now preserved in the Muséum d'Histoire Naturelle at Paris.

The Ellis and Solander types of *Halimeda* are said also to have disappeared † but none of their figures and descriptions of West Indian forms is especially suggestive of *H. favulosa;* at least, such an application is not likely to be proved in absence of original specimens.

In *Halimeda favulosa*, the peripheral utricles and sometimes the filaments of the subcortical layer and of the central strand are now and then gorged with dense granular contents as shown in our FIGURE 4. We have found no evidence that such parts become detached, but for some reason a reserve food supply seems to be concentrated in them.

Avrainvillea levis sp. nov.

Olivaceous when living, on drying often slightly tinged with yellow or verging toward cinereous, or at the margins sometimes fuscous, caespitose or gregarious from a short, scarcely rhizomatous base: stipe 0.5–4 cm. long, flattened or subcylindrical, simple or occasionally dichotomous at base: flabellum varying from reniform-suborbicular with cordate base to cuneiform-obovate, 1–7 cm. broad, entire, erose, or sometimes lobed, thin and membranous or sometimes thicker and coriaceous, compact in texture with a smooth or slightly wrinkled surface, for the most part distinctly zonate, now and then tending to form serially superposed flabella at the margins of the zones: filaments of flabellum slender, tortuous, interwoven, usually lightly and irregularly torulose, rarely somewhat moniliform, mostly 6–24 μ in diameter; those of interior often a little larger (reaching 35 μ), more chlorophyllose and less tortuous: angle of dichotomy commonly acute (about 30°–45°), sometimes obtuse (reaching 120°). [PLATE 23, FIGURE 1; PLATE 23, FIGURES 8–10.]

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* Printed "*multicaulis*" by Hauck through an evident *lapsus*, as shown by label on Comoro specimen cited.

† Barton, E. S. The Genus *Halimeda*. Siboga-Expeditie, Monographe **60**: 1, 2. 1901.

In the Bahama Islands, near low-water mark, or when growing under a rock overhang sometimes exposed at low tide: *no. 3996*, type (Cave Cays, Exuma Chain, 19 February 1905, M.A.H.); *no. 3574* (Frozen Cay, Berry Islands); *no. 3966* (Shroud's Cay, Exuma Chain).

The above-described species, though here appearing under a new specific name attached to a new nomenclatorial type, is doubtless the same as the species described by Murray and Boodle (Jour. Bot. **27**: 70. 1889) under the designation "*A. sordida* Crn. excl. syn." But according to both the Philadelphia and the Vienna codes of nomenclature, the use of the name *Avrainvillea sordida* for this species cannot be justified unless perchance it can be shown to be identical with the species described from the Philippines by Montagne in 1844 as *Udotea sordida.* The combination "*A. sordida* (Mont.) Crn. mscr." apparently first appeared in print in Mazé and Schramm's Essai de Classification des Algues de la Guadeloupe (p. 89. 1870–'77) and is there based on quoted synonymy, the citation of Guadeloupe specimens under collection numbers, and the following description: "De couleur brune olivâtre à l'état de vie." Under these circumstances, when one excludes synonymy one excludes all that has technical value in publication, and the name *Avrainvillea sordida* Crn., if used at all, must be made to apply to Montagne's plant. Our species, if it is to be kept separate from its Eastern Hemisphere analogue, as at present we believe it should, deserves a distinctive name.

Avrainvillea levis has a smooth compact surface that suggests a *Udotea* at first sight, though its structure is clearly that of an *Avrainvillea.* The filaments of the flabellum, however, are not so uniform in character as is the case in the other West Indian species of the genus, the filaments of the surface being often more slender, more tortuous, and less chlorophyllose than those of the interior.

Avrainvillea levis, so far as our experience goes, is the most constant and most easily recognized of the West Indian forms of this puzzling genus. Our remaining specimens, representing at the present time about thirty localities, can be arranged, though rather unsatisfactorily, in two groups, which for the present we are designating as *Avrainvillea nigricans* Decaisne and *A. Mazei* Murray & Boodle. *Avrainvillea longicaulis*, as described and figured by Murray and Boodle,* we are convinced cannot be considered specifically different from *A. nigricans*, as represented by the probable type of the latter species preserved in the herbarium of the Muséum d'Histoire Naturelle in Paris.

The type of *Avrainvillea nigricans* Decaisne is referred to in the following words in the place of original description: † "In Antillis (îles des Saintes propè la Guadeloupe). — Cl. d'Avrainville. (v. in Herb. Mus. Paris.)." In the herbarium of the Paris museum, there is at the present time no specimen of d'Avrainville's collecting bearing the name *Avrainvillea nigricans*, but there is a single specimen associated with a label inscribed in Decaisne's hand: "*Avrainvillea nigra* Dne. Iles des Saintes près la Guadeloupe. M. D'Avrainville. 1842," and as this agrees with the description published under the specific name *nigricans*, there can be no reasonable doubt that it is the true type of the species in question. This specimen has a single somewhat worn and broken flabellum supported by a stipe a trifle more than 1 cm. long springing from a subcylindrical rhizome 3.5 cm. long, which is continued beyond into what may have been the stipe of another flabellum; the flabellum proper has a length of 3.3 cm. and its original width was probably about the same; the filaments of the flabellum are moniliform, as originally described, and have a diameter of 44–55 μ. We can discover nothing beyond its smaller size to distinguish it from the *A. longicaulis* of Murray and Boodle. The original *Rhipilia longicaulis* of Kützing ‡ "Ad Antillas (Herb. Sonder)" has not been found in the Kützing herbarium now owned by Madame Weber-van Bosse, and an inquiry in regard to it has been addressed to Melbourne, Australia, where the Sonder herbarium, cited by Kützing, is supposed to be.§ The plant needs further study. We have never seen filaments from a flabellum ending in slender hyaline hairs like those figured and described by Kützing.

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* Jour. Bot. 27: 70. *pl. 288. f. 1–5.* 1889.

† Ann. Sci. Nat. II. 18: 108. 1842.

‡ Kütz. Tab. Phyc. 8: 13. *pl. 28. f. 2.* 1858.

§ See "Addendum" on page 586.

Rhizoidal filaments often have such a character but Kützing states that the figured filament came "aus dem Phyllom."

Avrainvillea nigricans and *A. Mazei*, as we interpret them, are best distinguished by the character of the filaments of the flabellum, those of *A. nigricans* being moniliform and those of *A. Mazei* being cylindrical with an abrupt constriction at the base of each branch. The flabellum in *A. Mazei* tends to be more diffuse, fluffy, and irregular, and it is often greener. In three cases, we have found the two growing side by side and perfectly distinct in form, color, and in the microscopic characters of the threads, yet elsewhere specimens have sometimes been found which seem to hold a rather doubtful intermediate position. In one case (Bermuda, *no. 109*) filaments from two flabella springing from a single rhizome have different characters, those from the one being clearly of the *Mazei* type while those from the other make a close approach to the regularly moniliform condition of *A. nigricans*. The fact that *A. nigricans* and *A. Mazei* have been found wholly distinct when growing together under apparently the same conditions leads to the opinion that they should be considered separate species in spite of some present difficulties in the way of always recognizing them. Each of the two presents wide variations in form, size and color. What we believe to be a low-littoral or shallow-water condition of *Avrainvillea Mazei* forms greenish-brown, caespitose masses near low-water mark on exposed rocks, and has finger-shaped or round-capitate lobes, not developing a flabellum unless it descends a decimeter or more below the low-tide line. Among the forms that we are at present identifying with *A. nigricans*, one extreme is represented by plants with a suborbicular flabellum (reniform-cordate when young), reaching a width of 25 cm., supported by a cylindrical stipe, which has a maximum length, so far as observed, of 16 cm., this springing from a strongly developed rhizome; the other extreme has a cuneiform flabellum, sometimes no more than 1–2 cm. wide, tapering gradually to a flattened scarcely recognizable stipe, with rhizome poorly developed. Between these two extremes there seems to be a nearly perfect series of intermediates, but perhaps further familiarity with the genus, particularly with living specimens, will result in the recognition of some satisfactory basis for specific distinctions.

Cladocephalus gen. nov.

A genus of *Chlorophyceae* of the family *Codiaceae*. Thallus erect, consisting of capitulum and stipe, the latter attached to the substratum by matted rhizoids, all parts destitute of calcareous incrustation. Stipe and branches of the capitulum corticated, the medullary portion consisting of parallel, sparingly dichotomous chlorophyllose filaments, the cortical layer composed of much narrower, intricate, repeatedly divaricate-dichotomous filaments, which are finally deficient in chlorophyl. Capitulum thamnioid or scopiform, made up of numerous, irregularly dichotomous, non-zonate, often coherent or anastomosing branches. Mode of reproduction unknown.

The genus *Cladocephalus*, though having a slight superficial resemblance to *Penicillus* in habit and form, is most nearly allied to *Avrainvillea*, being in some respects intermediate between that genus and *Udotea*. It differs from both *Avrainvillea* and *Udotea* in having a thamnioid or scopiform capitulum instead of a flabellum; from *Avrainvillea* also in possessing a well-differentiated cortex; from *Udotea* also in the absence of zonation and from its corticated species in the intricate, labyrinthiform character of the cortex, which is made up of more regularly dichotomous, less pectinate filaments. *Cladocephalus* is doubtless as distinct from *Avrainvillea* as *Avrainvillea* is from *Udotea* and more so than *Rhipocephalus* is from *Penicillus*.* The genus, so far as known to the writer, is monotypic, the only species being

Cladocephalus scoparius sp. nov.

Very dark green or nigrescent when living, commonly becoming yellowish-brown, substramineous, or olivaceous on drying, solitary or gregarious, 5–14 cm. high; rhizoids forming a somewhat bulbous mass: stipe 2–10 cm. high, 3–7 mm. thick, subcylindrical or somewhat complanate, often alate or canaliculate above, simple or occasionally once or twice dichotomous, the branches sometimes again connate: capitulum scopiform, varying in outline from elongate-fusiform or elongate-ellipsoid to obovoid or subspherical, often somewhat flattened, 3–8 cm. long; branches subcylindrical or complanate, 0.3–2 mm. broad, frequently connate at points of casual contact, now and then subdenticulate near apices: filaments more or less fuscous in the older parts, sometimes bright-green in the younger; filaments of the cortex labyrinthine, lightly torulose when young, the ultimate branches in older parts 6–11 μ in diameter, finally subhyaline; filaments of medulla cylindrical or lightly and irregularly torulose, 30–75 μ in diameter, slightly or not at all constricted just above a dichotomy, covered by cortex at apices or rarely protruding: stipe similar to the capitulum in structure, its cortex a little thicker and firmer. [PLATE 25; PLATE 26, FIGURES 11–20.]

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* *Codiophyllum* J. E. Gray, judging from the author's description and figures (Ann. & Mag. Nat. Hist. IV. **10**: 139–141. *pl. 9.* 1872), is very different in structure, if indeed it is really a plant.

Rare and local in the Bahama Islands, on sandy or muddy bottom in 2–10 dm. of water (low tide): *no. 4079*, type (in a tidal pond, Georgetown, Great Exuma, 24 February 1905, M.A.H.); *no. 3081* (south shore of New Providence, 10 April 1904 — a single specimen).

Besides the single specimen collected on the shores of New Providence, we have thus far met with this remarkable plant on only one occasion, when several hundreds were found growing associated with two species of *Penicillus* in a small area in an inland pond which had been connected with the sea by an artificial canal. They seemed here to be in all stages of development, but unfortunately we have been unable to find in them anything that could be taken with confidence to be reproductive bodies. There are often, lying on and among the threads of the cortex, ovoid or subglobose bodies 40–50 μ in diameter, with densely granular contents, much resembling the supposed reproductive bodies figured by Kützing * for his *Rhipozonium lacinulatum* (*Udotea Desfontainii*); but these seem to be always free and unattached, their contents are of a little different green, and we believe that they represent an independent organism.

While the plant is uncalcified in the ordinary sense of the term, the stipe or its base is commonly infiltrated with multitudes of minute crystals which lie free in irregular clusters among the filaments, particularly of the cortex. When a piece of the stipe is dissected in a drop of water they often wash out in such numbers as to give a milky appearance to the water. The crystals dissolve with the evolution of gas on the application of acetic acid and are taken to be calcium carbonate.

The cortex is formed by branches originating subdichotomously from the more peripheral members of the medullary strand and becoming afterwards apparently lateral. These branches then undergo repeated divaricate forkings with a gradual diminution of diameter until finally they may have only one-fifth or even one-twelfth the diameter of the filaments of the central strand.

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* Phyc. Gen. *pl. 42. III. f. 2.* 1843.

B. NEW RHODOPHYCEAE

Sarcomenia filamentosa sp. nov.

Rose-red on drying or sometimes brownish-red, very delicate, gelatinous, gregarious or caespitose-pulvinate on other algae, 4–16 cm. long, pseudodichotomous below; main axes distinctly corticated for one-half to four-fifths the length of the plant, subcylindrical or complanate, ancipitous, 0.25–0.9 mm. in diameter near base, bearing occasional divaricate, rather rigid, simple or dichotomous septate rhizoids on the opposite lateral margins: cells of cortex polymorphous, ranging from orbicular and triangular-ovate to oblong and linear, toward base sometimes 12–16 times as long as broad: main branches dissolving above in numerous narrowly linear or ribbon-shaped articulate uncorticated branchlets 50–170 μ wide, these springing from the mid-ventral * line of the next older branch, their segments ⅔–1½ times as long as broad, consisting of four pericentral siphons and a pair of short cortical (?) siphons arranged end to end on each lateral margin, occasional marginal cells enlarged and more or less protuberant (potentially rhizoids); cross-sections of branchlets about twice as broad as high, showing a distinct costa, this especially prominent ventrally; branchlets furnished toward their apices with a secund mid-ventral row of unbranched monosiphonous filaments, these 0.2–1 mm. long, originating singly from a cell cut off from the anterior end of the ventral siphon of each segment, deciduous in older parts, cells of filament 7–20 in number, mostly 2–6 times as long as broad: reproductive organs unknown. [PLATE 27; PLATE 29, FIGURES 1–11].

On *Sargassum*, corallines, etc., washed ashore. Florida: *no. 2844*, type (Cape Florida, Biscayne Key, 29 March 1904, M.A.H. — also *nos. 2860* and *2865*); *no. 2822* (Virginia Key, 22 March 1904).

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* We use "dorsal" and "ventral" in the sense in which these terms are employed by J. Agardh (Anal. Alg. Cont. 5: 122–149. 1899) in apparent conformity with the customary usage as applied to leaves of cormophytes, the "ventral" being the "inner" or "upper" side. However, a comparison with creeping species of the superficially somewhat similar genus *Herposiphonia* suggests the possibility that these terms, if used at all, should be applied in the reverse sense.

Sarcomenia filamentosa does not appear to be very closely related to any of the described species of this chiefly Australian genus. The only other species to which monosiphonous filaments are attributed are, so far as we can discover, the Australian *Sarcomenia tenera* (Harv.) J. Ag., *S. dolichocystidea* J. Ag., *S. opposita* J. Ag. and *S. secundata* J. Ag., but these are all much coarser plants with Dasyoid or Cliftonioid rather than Polysiphonioid habit, and the origin and arrangement of the branchlets and monosiphonous filaments are more or less different in all of these. In its delicate Polysiphonioid habit, *S. filamentosa* is nearer the group which includes *S. miniata* (Ag.) J. Ag. (the type of which we have seen in hb. Agardh), *S. intermedia* Grunow, and *S. mutabilis* (Harv.) J. Ag., but these differ not only in absence of monosiphonous filaments, but also in cortex characters, etc.; in *S. mutabilis*, also, the branches have a marginal or submarginal instead of mid-ventral origin.

The apparent incongruity of referring delicate plants of the *miniata* type to a genus originally based upon the fleshy membranous *Sarcomenia delesserioides* has already been remarked by Grunow * and discussed at length by J. Agardh.† In placing the above-described new species in *Sarcomenia*, we accept, for the present, the current conception of the limits of the genus.

The plant changes color and partially decomposes very soon after being collected, even though placed in a moderate amount of sea-water. It adheres most firmly to paper on drying yet recovers its form well on being soaked out if the material was originally good and properly prepared.

Dudresnaya crassa sp. nov.

Rose-colored when living, dingy-purple or brownish-red on drying, densely ramose, lubricous, subpyramidal in contour, 6–8 cm. high, the primary branches appearing irregularly 1–2-pinnate when pressed on paper, the secondary and tertiary branches then mostly confluent, unequal in length, vermiform, apices obtuse; branches of all orders of nearly uniform diameter throughout, 1–2 mm. thick in natural state, 1.5–3 mm. after pressure, all parts very closely adherent to paper: monosiphonous axis much obscured by the very numerous decurrent filaments, its cells 2–8 times longer than broad; peripheral filaments 4–6 times dichotomous, beautifully fastigiate, 0.5–0.8 mm. long, scarcely constricted at the joints, 5–6 μ in diameter, the more peripheral cells 2–5 times as long as broad: carpogonial branch simple, consisting of 5–19 subspherical or somewhat discoid cells in a single series, its apex slightly deflexed and terminating in the much elongated, curved or nearly straight trichogyne; auxiliary-cell branches numerous, consisting of 5–9 enlarged subspherical or oblate-ellipsoidal cells near base, terminating in a multiarticulate prolongation similar to that of the other peripheral filaments or often shorter; auxiliary-cell occupying the middle of the enlarged portion of the branch and having little more than half the diameter of the two immediately adjacent cells, the latter much inflated, rich in contents, 15–30 μ in transverse diameter: cystocarps 0.12–0.24 mm. in diameter, often 2–4-lobed: antheridia and tetrasporangia unknown. [PLATE 28; PLATE 29, FIGURES 12–26.]

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* Reise seiner Majestät Fregatte Novara um die Erde. Bot. Theil 1 : 93. 1867.

† Anal. Alg. Cont. 5 : 130. 1899.

On rocks in 3 m. of water (low tide), Castle Harbor, Bermuda: *no. 315*, type (6 July 1900, M. A. H.); also a floating fragment at Spanish Point, Bermuda, *no. 198*.

Dudresnaya crassa is nearest allied to *D. coccinea* (Ag.) Crouan in the structure of the carpogonial branch and the auxiliary-cell apparatus and in the elongated cells of the peripheral filaments, but is very different in size and habit, in the obtuse ultimate branches which have nearly the diameter of the primary, in having its peripheral filaments 2–4 times as long as in *D. coccinea*, and in the highly specialized auxiliary-cell, which is always much smaller than the conspicuously enlarged adjacent cells. Thuret states* that in *D. coccinea* the branches which bear the antheridia occur on the same plants that bear the cystocarps; in *D. crassa*, the antheridia have been searched for in vain on the cystocarpic individuals — the only sort collected — and the species is believed to be dioicous. In its dense habit of branching, the species bears a closer superficial resemblance to *D. purpurifera* J. Ag., though the branches are obtuse and coarser; however, in structure of the carpogonial branch and the auxiliary-cell apparatus † and in the character of the peripheral filaments, it differs so widely that no detailed comparison is necessary.

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* Bornet & Thuret, Notes Algologiques, 36. 1876.

† See Oltmanns, Morphologie und Biologie der Algen 1: 688–691. *f. 441a, 441*. 1904.

The only specimen from the American side of the Atlantic which has heretofore been referred to the genus *Dudresnaya* is, so far as we know, one collected in the Tortugas, Florida, by Mrs. G. A. Hall and described as new by J. Agardh in 1899 under the name "*Dudresnaja canescens*" (Anal. Alg. Cont. **5**: 88). This, however, is a plant of entirely different habit from ours and is not a *Dudresnaya*, as a recent examination of the single type-specimen in hb. Agardh has shown.

The auxiliary-cell branches and cystocarps are very abundant in our material and we have been able to observe nearly all stages in their development and mutual relations, though without any serious attempt to study the internal cytological changes. In their general features, the fusion of the sporogenous filament and the auxiliary-cell and the subsequent development of the cystocarp take place very much as described and figured for *D. coccinea* by Bornet and Thuret and by Oltmanns. However, Thuret's description (*l. c.*) gives the impression that the fusion can take place with any one of three similarly enlarged cells of the auxiliary branch, while in *D. crassa* it seems always to occur with a single definite highly specialized cell lying between the two larger ones. The content of this cell appears at first very much like that of the adjacent cells, but as it matures it undergoes a change, becoming more homogeneous and translucent; at the same time the auxiliary-cell and the two neighboring cells become enveloped in an especially thick layer of mucus which stains yellowish with safranin. We regret that the behavior of the carpogonial branch after fertilization has escaped observation in this species. Carpogonia occur in moderate number in our material (we have seen 25 or 30), but all seemed unfertilized; and the sporogenous filaments travel such long distances that we have failed in attempts to trace them back to their ultimate source.

The type-specimen — *no. 315* — is associated with a *Chantransia*, which permeates it, more or less, and fringes its surface.

C. MISCELLANEOUS NOTES

CAULERPA CRASSIFOLIA (Ag.) J. Ag. Till Alg. Syst. **1**: 13. 1872

Caulerpa taxifolia β crassifolia Ag. Sp. Alg. **1**: 436. 1822. (Ex cluding synonymy.)

Caulerpa pinnata Web.-v. Bosse, Ann. Jard. Bot. Buitenzorg **15**: 289. 1898. Not *Fucus pinnatus* L. fil. Suppl. 452. 1781.

Under the name *Fucus pinnatus* * in the Linnaean herbarium, now in possession of the Linnean Society of London, is a single sheet of four or five fragmentary specimens which agree with the somewhat detailed original description sufficiently well to leave no reasonable doubt that they represent the type material of that species. The natural form of the plant is somewhat modified by drying and pressure, yet it is evident that the pinnules are cylindrical (or clavate), as afterwards figured and described by Turner (Hist. Fuc. **1**: 117. *pl. 53.*) and that the plant belongs in the section *Sedoideae* (J. Ag.) of *Caulerpa*, being close to *C. racemosa corynephora* (Mont.) Web.-v. Bosse.† In the younger parts of the specimens the pinnules are distinctly inflated at their apices and are less regularly distichous; it is probable that this character suggested the Linnaean words which puzzled Turner: "Inflorescentia est racemus ex verticillis cum fructificationibus pedicellatis, peltatis, planis."

Madame Weber in her scholarly "Monographie des Caulerpes" refers to an authentic specimen of the *Fucus pinnatus* of Turner in the herbarium of the British Museum. This specimen of Turner's we have not seen, but if it belongs to the Filicoid rather than the Sedoid group, the apparent disagreement with Turner's description and figure should suggest doubts as to its authenticity or suggest the possibility that Turner's material was mixed. In any event, the true type of *Fucus pinnatus* L. fil. should be sought in the Linnaean herbarium rather than in that of the British Museum.

In the Agardh herbarium at Lund are two specimens which, judging from the original citation, probably served as originals of the "*Caulerpa taxifolia β crassifolia.*" Of these only one is actually associated with the name *crassifolia;* this is a fragment in a pocket inscribed "Caul. taxifolia var. crassifolia Ag. e mari Antillarum mis. Sprengel." This is suggestive of the familiar figure of *C. crassifolia* given in the Pflanzenfamilien of Engler and Prantl, and attributed to Sachs, except that the pinnules are scarcely narrowed at the base and are of course flatter than indicated in that figure. The second specimen — which is of the same species — is marked "Fucus taxifolius Vahl variet. C. M. 1821. ex Ind. occ." The "In mari Indico & rubro" habitat, also cited by C. Agardh in his original publication of "*β crassifolia*" was evidently derived from the erroneously identified *Fucus pinnatus* of Linnaeus fil. and of Turner, which he cites as a synonym. J. Agardh apparently had become suspicious of the alleged synonymy, for (Till Alg. Syst. **1**: 14) he remarks, "utrum synonyma ibidem allata * * * ad eandem pertineant, dicere non auderem."

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* Mr. B. Daydon Jackson informs me that the handwriting is that of the younger Linnaeus, whom he considers to be the real author of the "Supplementum."

† Ann. Jard. Bot. Buitenzorg **15**: 360, 364. *pl. 33. f. 10–13.* 1898.

Caulerpa sertularioides (S. G. Gmel.)

Fucus sertularioides S. G. Gmel. Hist. Fuc. 151. *pl. 15. f. 4.* 1768.

Fucus plumaris Forsk. Fl. Aegypt.-Arab. 190. 1775.

Caulerpa plumaris Ag. Sp. Alg. **1**: 436. 1822. — J. Ag. Till Alg. Syst. **1**: 15. 1872. — Web.-v. Bosse, Ann. Jard. Bot. Buitenzorg **15**: 294. 1898.

That Gmelin's *Fucus sertularioides* is the same as the plant commonly known as *Caulerpa plumaris* is admitted by J. Agardh and, more recently, by Madame Weber-van Bosse. Gmelin's figure and description seem sufficiently conclusive; his plant was American ("in corallis americanis"), though no definite locality is given. The rulings of the recent International Botanical Congress at Vienna, though professedly applying only to the spermatophytes and pteridophytes, are explicit as to the maintenance of the oldest specific name.

Acetabulum Farlowii (Solms)

Acetabularia Farlowii Solms, Trans. Linn. Soc. Bot. II. **5**: 27. *pl. 3. f. 1.* 1895.

This species was founded upon three somewhat imperfect plants sent by Farlow to Thuret. In the place of publication the material is said to have come from the "southern point of Florida, Key West," but Professor Farlow writes us that the alga was collected in Biscayne Bay, Florida, by Dr. E. Palmer in 1874. At the close of the original description, which was necessarily brief from lack of material, Count Solms expresses the hope "that this remarkable plant will be found again soon."

On November 11, 1902, the writer found on the northeastern shore of the island of Key West, a considerable quantity of a handsome little *Acetabulum* growing attached to shells, stones, broken pieces of coral, etc., at just about the low-water line and rather closely confined to this zone. Adjacent, in water that was from 1 to 10 dm. deep at low tide, and occasionally approaching and intermingling with the lower-growing individuals of this small green *Acetabulum*, were numerous clusters of the larger, whiter, more rigid, and more strongly calcified *Acetabulum crenulatum* (Lamour.) Kuntze. A hand-lens showed the strong cusp or apiculum with which each ray of the disc in *A. crenulatum* always terminates in in the younger stages at least, while the rays in the smaller species appeared to be entirely destitute of an apiculum even in the youngest conditions that could be observed at the time. Confident that two species were represented by the specimens growing at this point and finding on returning to New York that the smaller plant evidently had much in common with the *Acetabularia Farlowii* as described and figured by Solms, we submitted specimens of it both to Count Solms and Professor Farlow, both of whom approved the reference to *A. Farlowii*, though with a certain amount of cautious reserve in view of the scantiness of the original material.

In March 1904, the writer again found *Acetabulum Farlowii* in abundance, this time at Miami, Florida, and at Cutler, both on Biscayne Bay. Here again, the *A. Farlowii* was confined to a rather narrow zone near the low-water mark, while *A. crenulatum* (which in Biscayne Bay is more profusely abundant than we have yet seen it elsewhere), with a wider range, had its best development in deeper water (best in 3 dm. to 4 m., low tide). The zones occupied by the two species occasionally, however, overlapped; the individuals intermingling in this common region were, as a rule, easily referred at sight to the one species or the other, though once in a while an individual was met with whose affinities seemed at first a little dubious. Yet we believe that the two are actually and always distinct and distinguishable and that the principal diagnostic characters may be contrasted as follows:

Acetabulum crenulatum	*Acetabulum Farlowii*
Discs usually well-calcified and whitish on drying, often 2 or 3 superposed, commonly infundibuliform or cyathiform, 5–15 mm. broad; sporangia (rays) mostly 35–60, persistently coherent, strongly apiculate in early stages, the apiculum sometimes obscure with age; aplanospores 200–500 to a sporangium.	Discs lightly calcified, green on drying, solitary, nearly plane, 4–7.5 mm. broad; sporangia (rays) mostly 20–30, lightly coherent or often separate and free, rounded-obtuse or truncate at apex from an extremely early stage; aplanospores 40–120 to a sporangium.

The feature in which, chiefly, the original description given by Solms needs amendment is in regard to the coherence of the rays. *A. Farlowii* was placed by Solms in a group with *A. Calyculus* under the caption "Rays even in the living state separate and free." An examination of some thousands of individuals in the living state leads us to the opinion that only about one in four or one in five has the rays separate and free. However, clusters of plants are found in which the rays of nearly every disc are discrete; other clusters in which the rays nearly always remain coherent, forming discs that are slightly concave or almost plane. In some cases, the rays are apparently discrete from the first; in others, they have probably become more or less separated by mechanical agencies.

Specimens of *Acetabulum Farlowii* obtained by the writer at Key West under the collection number *1676* were distributed in the Phycotheca Boreali-Americana as *no. 1032*. We have not met with the species in the Bahama Islands; so far as known, it is confined to southern Florida.

BATOPHORA OERSTEDI J. Ag. Öfvers. Kongl. Vet.-Akad. Förh. **11**: 108. 1854.

Dasycladus Conquerantii Crouan; Schramm & Mazé, Essai Classif. Alg. Guadeloupe, 47. 1865. — Mazé & Schramm, Essai Classif. Alg. Guadeloupe, 108. 1870–77. [According to specimens in hb. Mus. Paris., and hb. Mus. Brit., distributed by Mazé and by Mazé & Schramm.]

Botryophora Conquerantii Cramer, Neue Denkschr. Schweiz. Naturf. Ges. **32**: 6. *pl. 4. f. 1.* 1890.

Coccocladus occidentalis Conquerantii M. A. Howe, Bull. Torrey Club **31**: 96. 1904.

Coccocladus occidentalis laxus M. A. Howe, *l. c.* 95. *pl. 6. f. 1, 2.*

Batophora Oerstedi occidentalis (Harv.)

Dasycladus occidentalis Harv. Ner. Bor.-Am. **3**: 38. *pl. 41B.* 1858.

Botryophora occidentalis J. Ag. Till Alg. Syst. **5**: 141. 1887.

Coccocladus occidentalis Cramer, Neue Denkschr. Schweiz. Naturf. Ges. **30**: — (37). 1887.

The discovery that *Batophora Oerstedi* was published by J. Agardh four years previously to Harvey's *Dasycladus occidentalis*, and that it was apparently forgotten even by J. Agardh himself, is a good illustration of the surprises which must now and then await any one who is partial to the cause of priority in botanical nomenclature. In 1854 J. Agardh published a very full description both of "*Batophora*, J. Ag. mscr. Gen. nov. ex Siphonearum familia inter Oliviam et Dasycladum intermedium" (*l. c.* 107) and of its single species, *Batophora Oerstedi*, "Hab. ad radices Rhizophorae Mangle in sinu substagnante 'Krauses lagoon' dicto, ad Insulam St. Crucis: Oersted." In 1887, in publishing "Botryophora J. Ag. mscr.," he alludes to his already having designated the plant *Botryophora Oerstedi* in a collection of algae made by Oersted, even before Harvey published *Dasycladus occidentalis*, but there is no reference to his having already actually printed a description of the proposed new genus under a somewhat different generic name and this fact appears to have been overlooked, so far as we can discover, by all subsequent phycologists and bibliographers. If any evidence were needed that this omission on the part of Agardh was due simply to a lapse of memory and not to any intent to ignore, it would be furnished by his attitude toward certain other species and names published in the same paper.*

Possibly it may be objected that "Batophora" is a misprint for the "Botryophora" of thirty-three years later. To this it may be replied that "Batophora" is well formed etymologically, is fully as significant and appropriate as "Botryophora," and in the Agardh herbarium the name *Batophora Oerstedi* appears in connection with one of Oersted's specimens.

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* *E. g.*, *Bryopsis Duchassaingii* J. Ag. Öfvers. Kongl. Vet.-Akad. Förh. **11**: 107. 1854. — "Hoc nusquam a me publici juris factum, jamdudum oblitum credidissem" (Till Alg. Syst. **5**: 31. 1887).

In the Agardh herbarium are several small sheets of specimens which probably served as the original materials of *Batophora Oerstedi.* Three of these are fastened to a larger sheet; the others are loose in another cover with a loose label. Only one (one of the fastened sheets) has an individual inscription and this is inscribed simply "*Batophora Oerstedi.*" The specimens illustrate the condition of the species which is found in quiet and often merely brackish water — a condition characterized by large size, lax habit, and obovoid or oblong-ellipsoidal sporangia, which occur at the ends of the branches of the first three orders. *Coccocladus occidentalis laxus* M. A. Howe is a form that is very common in the Bahama Islands, growing in interior ponds of which the nearly fresh water responds only slightly to the changes of the tides — often associated in about equal abundance with *Chara Hornemanni* and *Ruppia maritima.* Since seeing authentic material of *Batophora Oerstedi* and *Dasycladus Conquerantii* and since studying these plants in the living condition on two visits to the Bahamas, we hardly think it worth while to maintain the subspecific name *laxa.* The contrast in size and habit and in form and position of sporangia, between the lax plants of the interior brackish ponds and the condensed ones of the border of the open ocean (here placed under the subspecific name *occidentalis*) is remarkably striking, yet the peculiarities of each, we believe, are directly connected with the degree of salinity and quietness of the water. Intermediate forms occur in places of intermediate character.

NEOMERIS COKERI M. A. Howe, Bull. Torrey Club **31**: 97. *pl. 6. f. 3–12.* 1904

This strongly marked species, described from material collected by Professor Coker in 1903, on the island of Eleuthera, Bahamas, is not uncommon throughout the Bahamian archipelago, ranging at least from the Great Bahama on the north to the Great Exuma on the south. Its usual habitat is under shelving rocks near the low-water line. The original description was based on rather small individuals having a length or height of 7–14 mm.

A maximum height of 37 mm. has since been observed and the spores are sometimes oblong-ellipsoidal instead of obovoid.

FUCUS SPIRALIS L. Sp. Pl. 1159. 1753

The above name has now and then since the time of Linnaeus been applied by European writers to certain forms of North European rockweeds representing doubtless two species, the one always synoicous, the other a condition of the always dioicous *F. vesiculosus*. In America, the name has had little vogue, except as used by Farlow * and others for a variety of *F. vesiculosus*, without citation of Linnaeus. In 1883, Kjellman in "The Algae of the Arctic Sea" † definitely recognized *Fucus spiralis* L. as a species, though in 1890 ‡ he renamed the species *Fucus Areschougii* Kjellm., having apparently become doubtful as to the identity of the Linnaean plant. De-Toni §, however, a little later, quotes *F. Areschougii* as a synonym of *F. spiralis* L. without any indications of doubt, and more recently Börgesen || has given a detailed discussion of the subject, in which he considers not only *F. Areschougii* Kjellm. but also *F. platycarpus* Thuret to be synonyms of *F. spiralis* L. Börgesen's determination of *Fucus spiralis* rests chiefly on the Linnaean descriptions. As is well known, the comparatively modern idea of nomenclatorial type-specimens was not recognized by Linnaeus, and the herbarium that he left is not always satisfactory or conclusive to the one who would see the materials that he actually had before him in writing his descriptions. Nevertheless, the specimens in the Linnaean herbarium to which we may believe Linnaeus himself attached the name *spiralis* are of much interest in this connection and it may be said that they seem to support Börgesen's position. There are under this name in the Linnaean herbarium, which we were permitted to examine through the courtesy of Mr. B. Daydon Jackson, two specimens fastened to separate sheets, each inscribed at the bottom "4 spiralis" in Linnaeus' hand. Both specimens are fertile and both are without vesicles. The wholly justifiable restrictions placed

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* Mar. Alg. N. E. 101. 1881. — Farl. And. & Eat. Alg. Exsic. Am. Bor. *109 bis*.

† Kongl. Sv. Vet.-Akad. Handl. 20^6: 202.

‡ Handb. Skand. Hafsalgflora, 11.

§ Syll. Alg. 3: 207. 1895.

|| Mar. Alg. Faeröes, 472–477. 1902.

upon the use of this historic collection did not permit any attempts to determine whether the plants are synoicous or dioicous, but one, at least, of the two, is, in our opinion, very clearly a rather small specimen of the typical *Fucus Areschougii* Kjellm. This specimen is 10 cm. high, the branches are somewhat contorted and 4–6 mm. broad above, the distinct costa alone persisting in most of the lower half; the receptacles are ovate, obovate or suborbicular, and 5–8 mm. long. It evidently represents a form of the synoicous species which on the eastern coast of North America is common from Maine to Newfoundland and doubtless ranges farther north; it is confined to a rather narrow zone near the high-water mark. Specimens illustrating this form from Cape Rosier, Maine, were issued as *no. 234* of the Phycotheca Boreali-Americana of Collins, Holden & Setchell under the name *Fucus Areschougii* Kjellm. The other Linnaean specimen cannot be so confidently determined without dissection, yet we have little doubt that it also represents a condition of the same synoicous species. This is a larger, uncontorted plant, with more elongated receptacles and more conspicuous cryptostomata, and the wings are more persistent below; it is about 20 cm. high, the even-topped branches are 4–8 mm. wide, the verrucose receptacles are 8–20 mm. long, mostly 2–3 times as long as wide, though one or two are suborbicular. This appears to exemplify a form of the species which in North America is rather more southern in its range than the other, being not uncommon near the high-tide line in Long Island Sound within the limits of New York City. This more southern form occasionally approaches *Fucus platycarpus* Thuret in habit, and specimens from Marblehead Neck, Massachusetts, were distributed under that name in the Phycotheca Boreali-Americana, *no. 1132*; however, we have seen no American specimens in which the receptacles are as pronouncedly lateral as in the typical *F. platycarpus* of northern France. The larger forms of *Fucus spiralis* are sometimes imitated by certain evesiculose conditions of *F. vesiculosus*, but can be distinguished by being always synoicous and usually also at sight by having more strongly verrucose and more margined receptacles. It grows typically in a higher zone on the rocks than does *F. vesiculosus.* Vesicular inflations are occasionally present, but they are much elongated and irregular in form and position.

It is of interest to add that the writer has sent photographs of the two Linnaean specimens of *Fucus spiralis* to Dr. Börgesen, who writes: "One of them is a true *Fucus spiralis* (= *F. Areschougii* Kjellm.), the other is a little dubious, it may be *Fucus spiralis*, but it also very well may be a form of *Fucus inflatus*."

FUCUS POITEI Lamour. Diss. 63. *pl. 31. f. 2, 3.* 1805

That the *Fucus Poitei* of Lamouroux was a *Laurencia* seems to have been suspected first by the keen-eyed Kützing.[*] J. Agardh, a little later, judging, as would appear from his discussion, only from Lamouroux's description and figures (and possibly somewhat influenced by the fact that Lamouroux in 1813 placed the plant in *Chondrus* instead of in *Laurencia*), referred this *Fucus Poitei* to the very different genus *Gracilaria* and expressed his confidence in the correctness of this determination by writing an exclamation mark after the citation. Since that time, so far as we can discover, this determination has not been questioned and "*Gracilaria Poitei* (Lamour.) J. Ag." has held a place in general monographs and in special papers relating to West Indian algae.

In the herbarium of Lamouroux at Caen, which we had the privilege of seeing in the summer of 1904 through the courtesy of Professor Octave Lignier, there are in the cover devoted to this species a single small mounted specimen (4 cm. high, 6.5 cm. broad), two loose fragments, a loose slip of paper inscribed "fucus poitei" in the handwriting of Lamouroux, and two drawings marked "fig. 3" and "fig. 4^{me}." Fig. 3 was published as *f. 2*; fig. 4^{me} as *f. 3*. The specimens, which Lamouroux's good diagnosis and rather poor figures allow us to assume, with much confidence, to be parts of the original, belong to the genus *Laurencia* and to the common West Indian species described by J. Agardh under the name *L. tuberculosa*[†] and afterwards figured and described by Kützing as *L. mexicana*.[‡]

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[*] Species Algarum, 857. 1849.

[†] Sp. Alg. **2**: 760. 1852.

[‡] Tab. Phyc. **15**: 25. *pl. 70. f. c. d.* 1865.

Explanation of plates 23-29

PLATE 23

1. *Avrainvillea levis.* Photograph of two dried specimens(*no. 3996*, type —, Cave Cays, Exuma Chain, Bahamas, 19 F 1905, M. A. H.), natural size.

2. *Halimeda favulosa.* Photograph of about one half of one segment of a dried specimen (from *no. 3981*, type), magnified sixteen diameters.

PLATE 24. *Halimeda favulosa*

Photograph of dried specimen (*no. 3981*, type —, Cave Cays, Exuma Chain, Bahamas, 19 F 1905, M. A. H.), reduced to about two-thirds the natural dimensions.

PLATE 25. *Cladocephalus scoparius*

Photograph of formalin-preserved specimens (*no. 4079*, type —, Georgetown. Great Exuma, Bahamas, 24 F 1905, M. A. H.), natural size. The young plant at the right with the truncate apex shows only the beginning of the differentiation of the capitulum; the other two short plants represent later, though still very immature, stages in the development of the capitulum — in one the stipe is furcate above, the two branches again coalescing; the three largest specimens are typical full-grown plants.

PLATE 26

1–6. *Halimeda favulosa*

1–3. Peripheral utricles, decalcified, in lateral view.

4. Peripheral utricles with dense granular content (see page 565).

5. Peripheral utricles in surface view, decalcified.

6. Filaments of the central strand, showing mode of union at the nodes.

Figures 1–6 are all enlarged 40 diameters and are all drawn from the type material, *no. 3981* (Cave Cays, Exuma Chain, Bahamas).

7. *Halimeda tridens*

7. Peripheral utricles, decalcified, in lateral view, × 40. Introduced for comparison with *H. favulosa.*

8–10. *Avrainvillea levis*

8. One of the larger filaments from the flabellum, with dichotomy.

9. A filament of the usual size, from flabellum.

10. A filament from apical margin of flabellum, with wide-angled dichotomy.

Figures 8–10 are all enlarged 150 diameters; 8 and 9 are drawn from the type material, *no. 3996* (Cave Cays, Exuma Chain, Bahamas); 10, from *no. 3966.*

11–20. *Cladocephalus scoparius*

11. One of the main branches of the capitulum, showing ramification, natural size. The left-hand side was toward the middle of the capitulum.

12. A detail of the branching of the capitulum, showing anastomoses, × 2.

13. Cross-sections of branches of the capitulum, × 4.

14. Fragment of a branch of the capitulum in surface view with part of cortex removed, disclosing medullary filaments, × 55.

15. Medullary filament from apex of capitulum, × 55. The branch at the left, now becoming lateral, represents the beginning of the cortical system.

16. The branch at the right represents a later stage in the development of the cortex, × 55.

17. Cross-section of stipe, × 4.

18. Cortical region of stipe in cross-section, × 150. Drawn from a microtome section 20 μ in thickness.

19. A stage in the differentiation of the cortical filaments later than that shown in figure 16, × 55.

20. Final form of cortical filaments of capitulum, × 150.

Figures 11–20 are drawn from formalin-preserved material of the type, *no. 4079* (Georgetown, Great Exuma, Bahamas).

PLATE 27. *Sarcomenia filamentosa*

Photograph of dried specimen (*no. 2844*, type —, Cape Florida, 29 Mr 1904, M. A.·H.) attached to *Sargassum*, natural size.

PLATE 28. *Dudresnaya crassa*

Photograph of dried specimen (*no. 315*, type —, Castle Harbor, Bermuda, 6 Jl 1900, M. A. H.), natural size.

PLATE 29

1–11. *Sarcomenia filamentosa*

1. Apex of polysiphonous branchlet, ventral view, showing apical cell and origin of the paired marginal cells and of the monosiphonous filaments, × 193.

2. Older part of branchlet, dorsal view, × 193.

3 and 4. Cross sections of uncorticated branchlets, ventral side downward, × 193.

5. Apical portion of uncorticated branchlet, with the unifarious monosiphonous filaments, × 48.

6. Branchlet viewed from margin, showing bases of the monosiphonous filaments, × 193.

7. Part of an older branch, ventral view, showing origin of polysiphonous branchlet (really from axial siphon), × 44. Marginal cells at somewhat regular intervals are enlarged and protuberant (potentially rhizoids). The monosiphonous filaments have here disappeared, but the cell cut off from the anterior end of the ventral siphon marks their former position in each thallus-segment. Small intercalary cells, originating chiefly from the pericentral siphons, constitute the beginning of the cortex.

8. A similar branch, dorsal view, × 44. The rhizoids are here growing out.

9. Surface view near the base of one of the largest stems seen, showing cortical cells, × 40.

10. Cross-section of a similar main stem × 44.

11. Cross-section of an ordinary main axis in the basal third of the plant, × 44.

Figures 9 and 10 are drawn from our *no. 2860*; figures 1–9, and 11 are from the type material, *no. 2844* (Cape Florida).

12–26. *Dudresnaya crassa*

12. Outer portion of peripheral filament.

13–15. Carpogonial branches.

16 and 17. Auxiliary-cell branches; auxiliary-cell occupying middle of enlarged portion, lying between two much larger cells.

18–22. Fusion of sporogenous filament with auxiliary-cells; in figure 21, two cells (indicated by dotted lines) appear in the position formerly occupied by the auxiliary-cells; in figure 22, three cells occupy this position — the protruding one at the left will form the main body of the cystocarp or one lobe of it.

23–26. Cystocarps, showing relation to original auxiliary-cell branch and to the sporogenous filaments. The small peduncled cystocarp, developed at some distance from the original auxiliary-cell, shown in figure 26, is abnormal. Figures 24 and 25 show mature cystocarps, the one unilateral, the other more symmetrical and 3-lobed.

Figures 12–26 are all enlarged 193 diameters and are all drawn from the type material, *no. 315* (Castle Harbor, Bermuda). The outer limits of the gelatinous cell-walls are scarcely visible except by staining and the lines as drawn give an exaggerated idea of their distinctness.

Addendum

While this paper is going through the press and is in the paged-proof stage, an opportune communication from Mr. J. R. Tovey, acting curator of the National Herbarium of Victoria, Australia, reaches us, enclosing a portion of the original specimen of Kützing's *Halimeda brevicaulis*, a species which is discussed on page 564. As is true in the case of several other species, Kützing evidently saw the plant in "Herb. Sonder," which is now in the possession of the National Herbarium of Victoria. The label of the specimen in question, a transcription of which we owe to the kindness of Mr. Tovey, reads, "*Halimeda brevicaulis* Kuetz. Tab. Phyc. VIII. tab. 25. India occidental." In the place of original publication, the locality is given as "Bahamas-Inseln," but the fragment sent by Mr. Tovey is manifestly the very one sketched by Kützing in his figure *b*. The plant is not *Halimeda favulosa;* as already surmised (page 564), it is probably to be considered a lax flaccid condition of *H. tridens* (*H. incrassata*). The peripheral utricles, however, are rather larger than is usual in *H. tridens*, measuring 50–80 μ in diameter in surface view; the filaments of the central strand cohere at the nodes.

Mr. Tovey kindly sends us also fragments of the flabellum and stipe of Kützing's *Rhipilia longicaulis*, to which we have alluded on pages 567 and 568. These indicate clearly, we think, that the species is the same as the more recently published *Avrainvillea Mazei* Murr. & Boodle. The filaments of the flabellum are now and then slightly torulose, but they are mostly cylindrical without constrictions, except for the strong one where they leave the dichotomy; the ends of some of the branches are thin-walled and shriveled, but they are not destitute of chlorophyl and should not be considered hairs.